

Fertilizer & Pesticide

Wellhead Protection Best Management Practices

An Integrated Approach To Preventing Water Impairment

Water wells are a common means of providing drinking water in rural Montana. Almost all private residences outside of towns and over 40 percent of all the public water systems in the state use relatively shallow alluvial water wells for their water source. The location of these wells and the manner in which they are used can influence the introduction and movement into the ground water. Ground water can be impaired and contaminants can be spread by the development and use of water wells. As ground water is developed more extensively in Montana, it will become more important to evaluate how the location and management of wells can impact the quality of ground water and its quantity.

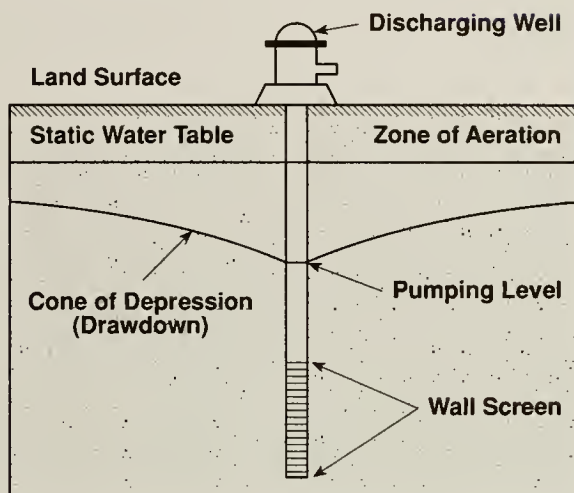
Protect Ground and Surface Water

Nonpoint sources of potential impairment are exempt from the nondegradation rule (Administrative Rules of Montana 16.20.1011) where reasonable land, soil and water management practices have been applied. However, cropland on which pesticides and fertilizers are applied may lie within a wellhead protection delineation zone for a public water supply. In 1991, the United States Department of Agriculture made ground water protection a criteria for nominating new lands for inclusion in the *Conservation Reserve Program*. Agricultural lands within a certified Wellhead Protection Area would be given the highest priority, thus creating an incentive to protect public drinking water supplies from agricultural chemicals. The proposed Montana Wellhead Protection Program, coordinated by the Montana Department of Health and Environmental Science, is a voluntary program to protect ground water used for public drinking supplies from contaminants which may have adverse effects on human health.

Evaluating the Well Location

Choosing a good site for your new well may be the most important decision you make in protecting your drinking water from impairment. The decision may be difficult, however, because there are so many potential sources of ground water impairment. But if you follow these guidelines, your chances of impairment will be greatly reduced.

- ✓ Locate your wellhead on the highest ground available. This is no guarantee that water will be safe,



though, because using a well creates an area of ground water "drawdown". As the well pumps water from the aquifer, water beneath nearby fields moves to the well more quickly. Even contaminants in downslope areas may be drawn toward the well.

- ✓ Locate the well above the flood level of nearby surface water.
- ✓ Locate the well as far as possible from potential sources of contamination (such as barnyards, septic systems, fuel storage tanks, animal wastes and agricultural chemical storage, mixing and loading areas).
- ✓ Check with county or state authorities to determine the proper setback distances and if there was ever a nearby dump site, underground storage tank, or other possible sources of contamination.
- ✓ Ideally, place the well on the side of the impairment source opposite the flow of ground water. In general, ground water flows in the direction of a discharge point, such as a river, stream or lake. This means you should try to position the well so the source of impairment is between it and the river, stream or lake.

Properly Construct Your Well

Some problems with well construction are obvious: evidence of poor cementing or visible cracks in the casing. But quite often, not-so-obvious problems are responsible

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for your water quality concerns. Therefore, whether you are designing a new well or evaluating the safety of an existing one, it's important to look at four main areas:

1. Watertight casing
2. Grout
3. Watertight seals
4. Graded slope

Seal Abandoned Wells

Every year, many wells are abandoned when they are replaced with new wells or when homes are connected to community water systems. When an abandoned well is improperly sealed, or not sealed at all, it can be hazardous.

Abandoned wells may provide a direct path from the land surface to ground water. An old well can allow runoff water to flow directly down to the aquifer, often carrying fertilizer and pesticide residues into the ground water. This bypasses the natural filtering and degradation that takes place as these materials move through the soil.

Ground water quality may be endangered also if an abandoned well connects two aquifers of different quality, such that exchange of water occurs between an important drinking water aquifer and another water-bearing zone which has poor water quality. There is also the risk of someone falling into an unsealed abandoned well. In sealing an abandoned well several objectives must be met:

- Elimination of a physical hazard.
- Prevention of ground water impairment by surface and runoff impairment.
- Prevention of ground water loss from artesian or flowing aquifers.
- Prevention of the mixing of desirable and undesirable underground waters.

Wellhead Protection

Best Management Practices (BMPs)

A variety of factors must be considered in wellhead protection. Often the use of several practices will be necessary. Consider the following practices:

- ✓ Protect wells from back-siphoning.
- ✓ Don't handle or apply chemicals within the vicinity of a well.
- ✓ Inspect and maintain all wells in good condition (i.e., capped, no rodent damage, no cracks, broken seals or other degradation).

- ✓ For an onsite well, the concrete pad or clay fill should be elevated to force drainage away from the well.
- ✓ Prevent runoff that ponds near the wellhead to prevent seeping around the well casing or through a crack in the casing into the well water.
- ✓ Properly abandon all wells that are not in use.
- ✓ Elevate or curb wells to prevent spills or surface runoff from entering the wells.
- ✓ Protect water lines from back-siphoning by using air gaps, a back flow check valve or other mechanism.
- ✓ Conduct a Farm*A*Syst assessment of your farmstead.#
- ✓ Contact local officials about the requirements for private wells.
- ✓ Never store agricultural chemicals close to a well of any kind, even an abandoned one, since the well casing can provide a direct conduit to ground water.
- ✓ Maintain a reasonable buffer area between the mixing area and any surface water (ditches, ponds and streams).
- ✓ Check current state guidelines and make sure the wellhead is in compliance.

Farm*A*Syst Fact Sheets and Worksheets (EB 125) may be obtained through Montana State University Extension Publications or through your local MSU Extension Agent.

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